

VARIABILITY IN DEVELOPMENT OF THE LAND USE INTENSITY IN AGRICULTURAL COMPANIES

E. Svobodová, K. Vinohradský

Received: March 8, 2011

Abstract

SVOBODOVÁ, E., VINOHRADSKÝ, K.: *Variability in development of the land use intensity in agricultural companies*. Acta univ. agric. et silvic. Mendel. Brun., 2011, LIX, No. 4, pp. 349–354

The aim of this article is to analyse the variability of the intensity of the land use in agricultural enterprises farming in different natural conditions in the years 2001–2006. The main reason for this analysis is the diminishing intensity of agricultural production in the Czech Republic in the nineties as well as in the past decade. This article is a part of the research with special focus on the signs of the extensive and intensive systems of agriculture in the developmental differentiation of agricultural enterprises.

As the data source for the analysis made in this article has been used the group of companies NUTS II Southeast in the period 2001–2006, i.e. in the time before and after our joining the EU. The group of companies includes legal entities with agricultural area under cultivation over 1 000 ha and average agricultural area 1 680 ha.

The results show that the decrease in the agriculture intensity in the years 2001–2006 reached 179 Czech crowns per hectare and the average Earnings from Produce per hectare is 26 792 Czech crowns per hectare.

Beside the variability of the intensity of the agricultural land use, there was also focused how the different natural conditions influence the land use intensity in the enterprises.

The results in this article show that there is significant and deepening inter-enterprise differentiation of the level of intensity of farming, but it is also necessary to say, that the impact of various agro-ecological conditions on the development of intensity of farming is not dominant.

agricultural produce intensity, natural conditions, agricultural companies

Analyses of the Czech agriculture show a lower level of its productivity. The lower productivity is connected with the decrease in intensity of agricultural production as a result of a considerable drop of agricultural production in the Czech Republic in the nineties. The lower intensity of the use of natural resources in agriculture in comparison with the countries of EU15 is typical for the development of agriculture in the Czech Republic in the past decade, too.

The authors of this article have been researching the developmental tendencies in agribusiness and their attention is also focused toward the signs of the extensive and intensive systems of agriculture in the developmental differentiation of agricultural enterprises. This article presents results of the

research of the development of the intensity of agricultural production in agricultural enterprises in the farming regions with different agro-ecological conditions in the period 2001–2006.

The aim of the research, the results of which are presented in this article, was to analyse variability of the development of intensity of agricultural land use in agricultural enterprises farming in different natural conditions in the years 2001–2006, i.e. in the time before and after our joining the EU.

MATERIALS AND METHODS

The research was carried out in the framework of a set of 78 farms of NUTS II Southeast, i.e. regions of South Moravia and Vysočina (Highlands). These farms have been included in the database net

FADN ČR, the methodical principles of which are described by HANIBAL *et al.* (2004).

The definition of intensification of agricultural production and differentiation of intensive and extensive systems of agricultural farming is based on the theoretical concept as described in the works of BEČVÁŘOVÁ, GREGA, VINOHRADSKÝ (1998), BEČVÁŘOVÁ, VINOHRADSKÝ (2005), GREGA (2004); the objective of their research is the intensity of the utilisation of the farm land seen through the indicator of the volume of agricultural production per hectare of the tilled area of land. The available data of the FADN file are specified by the indicator of the Earnings from Produce per hectare of the farmland (TZP in Czech, EFP in English).

Differentiation of the level of intensity of agricultural production in particular years as well as in the whole period was described by means of standard characteristics of variability (standard deviation, variation coefficient). To get the overall synthesising view, three basic groups of enterprises were identified: enterprises with high (1), moderate (2), and low (3) levels of intensity of utilization of farming land while the moderate level was defined within the interval: mean of the set ± 0.3 standard deviation.

Differences in the developmental trends of the intensity of agricultural production were monitored by means of defining the average annual increases (decreases) of earnings on produce per hectare and were quantified from the linear alignment of the given time line (increase parameter of linear trend).

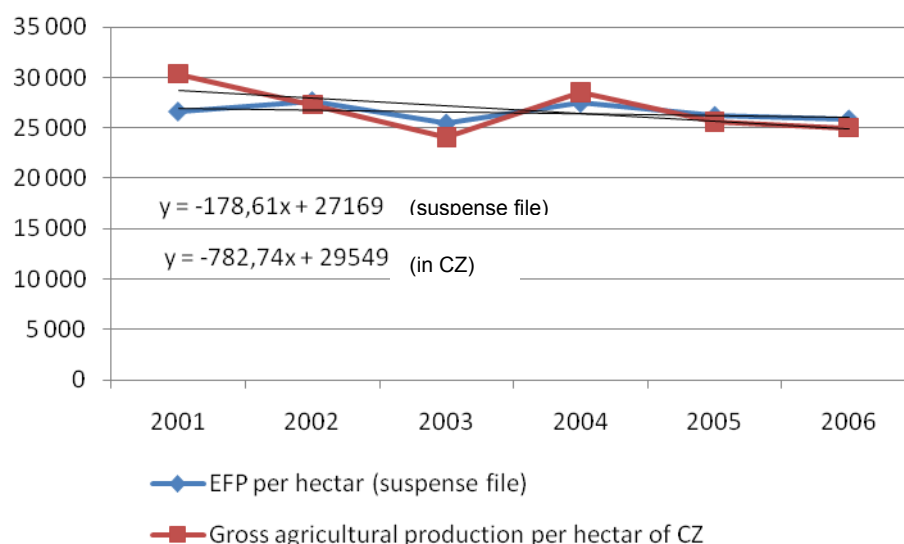
To get the framework for defining the diversity of nature conditions, the authors of this paper split the whole set of enterprises into four groups using

the criteria of the location of the region, altitude, and LFA (less favourable areas) into four respective groups:

1. a group of enterprises with favourable natural conditions,
2. a group of enterprises with good natural conditions,
3. a group of enterprises with the predominance of LFA (other),
4. a group of enterprises with the predominance of LFA (mountain).

RESULTS

The development of the intensity of agricultural production in the years 2001–2006 shows a slightly downward trend in the framework of the researched set of enterprises as well as in the global agriculture, while the inter-annual fluctuations mainly due to the fluctuations in the natural conditions are of a similar nature. This comparison together with the position of the enterprise in the set depending on different natural conditions suggests the general assumption of the development of all the agricultural enterprises in the Czech Republic. Well-known figures of the tendencies of development of agriculture of the Czech Republic show considerable decrease in the volume of production of Czech agriculture and its intensity in the nineties, while the past decade saw a slower rate of decline in the volume and intensity of use of the agricultural resources. In the researched set of 78 agricultural enterprises located in regions NUTS II Southeast in the years 2001–2006, the above mentioned decrease was 179 Czech crowns per hectare.



1: Development of the agricultural production intensity in the tracking period

Source: FADN CZ VÚZE Prague, Database of the thematic line 04 a 05 the MENDELÚ research object, ČSÚ, authors calculation

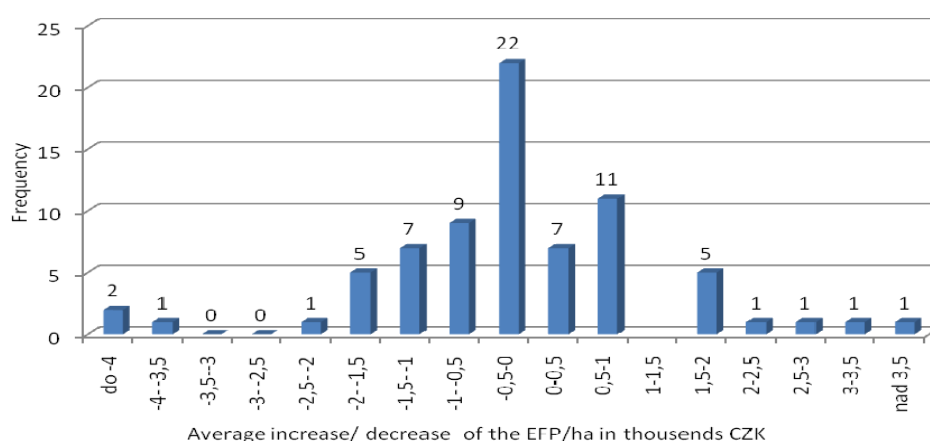
Notes: Agricultural production intensity is measured by Earnings from Produce per hectare of the farmland, as is in CZK.

The data of the Czech Republic and suspense file was made the linear alignment.

The analysis of the variability of average annual increases in the researched set of enterprises (Chart 2) suggests an idea of considerable differentiation of developmental trends in intensity of agricultural production among agricultural farms in the Czech Republic. In the years of our research, on the one hand average agricultural production in the whole Czech Republic and in the selected set moderately decreased, but on the other hand 31 farms out of the set increased their production, and 20 farms went considerably high. This means

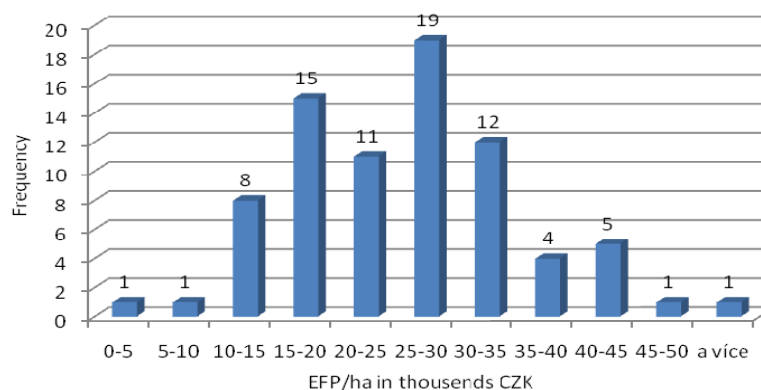
that approx. one third of the farms tend to develop more intensive system of farming as opposed to 24 enterprises with the falling production per unit of farm land, which indicates a certain tendency toward more extensive use of farm land.

Great variability in the average level of intensity of agricultural production within the researched period among the group of enterprises caused by their economic development is to be seen in Chart 3 and the data in Tab. I. Average Earnings from Produce (EFP) per hectare is 26 792 Czech crowns



2: Companies frequency according to the average year's increase of the EFP per hectare of the farmland in the years 2001–2006

Source: FADN CZ VÚZE Prague, Database of the thematic line 04 a 05 the MENDELU research object, ČSÚ, authors calculation



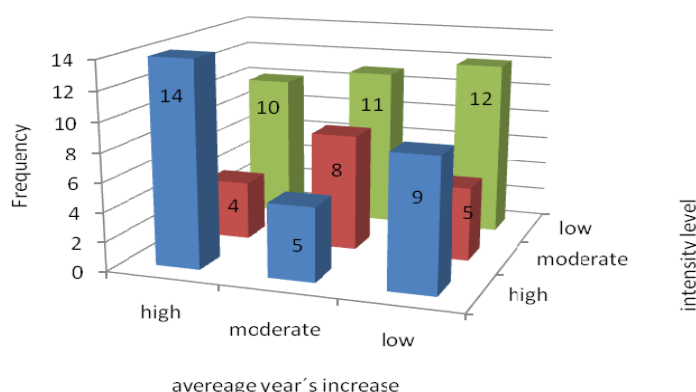
3: Companies according to average land use intensity in the years 2001–2006

Source: FADN CZ VÚZE Prague, Database of the thematic line 04 a 05 the MENDELU research object, ČSÚ, authors calculation

I: Development of the Earnings from Produce per hectare of the farmland in the companies with high, moderate and low intensity of agricultural production (in CZK)

Intensity	2001	2002	2003	2004	2005	2006	2001–6
high	40 316	42 932	39 143	41 879	38 377	38 555	40 200
moderate	26 556	26 894	25 912	27 892	27 587	27 306	27 025
low	15 277	16 047	15 334	18 013	17 475	17 200	16 558
average	26 628	27 663	25 440	27 621	26 874	26 524	26 792

Source: FADN CZ VÚZE Prague, Database of the thematic line 04 a 05 the MENDELU research object, ČSÚ, authors calculation



4: Companies frequency according to level and development of the intensity in the years 2001–2006

Source: FADN CZ VÚZE Prague, Database of the thematic line 04 a 05 the MENDELU research object, ČSÚ, authors calculation

in the total set and the variation range reaches more than 110 thousand Czech crowns per hectare. This data was used to analyse the differentiation of the level of intensity and to create three levels of agricultural intensity. The moderate level was defined within the interval: mean of the set ± 0.3 standard deviation. In the high level of intensity there are 28 enterprises, medium level 17, and low level 33 enterprises.

Combined classification of enterprises according to the level of agricultural production measured by coefficient of EFP per hectare and average annual increase of this coefficient (Chart 4) shows the ongoing tendency of inter-enterprise differentiation

in the levels of intensity during the researched period of time.

A question follows about the degree of influence of different agro-ecological conditions on the development of the intensity of agricultural production or about the impact of these conditions in the process of inter-enterprise differentiation or extensification of agricultural production and the answer is obvious from data in Tab. II and Tab. III. Frequency of enterprises with different level of intensity in different natural conditions suggests that under favourable and good conditions (1 and 2) we can see mainly enterprises of high or at least medium intensity, while higher altitude potato-growing regions (3) and submontane and mountain regions (4) rarely fall into this category. And in the opposite way: enterprises with lower intensity prevail mostly in relatively less favourable conditions, but we can see them among enterprises with favourable conditions, too. If we consider the differences in the average level of intensity among enterprises in different natural conditions as presented in Tab. III., we can draw a conclusion that certain tendency toward lower intensity of production per unit of area of farm land, i.e. toward the more extensive type of farming, is apparent in relatively worse or worst agro-ecological conditions.

II: Frequency of the Companies with different agricultural production intensity in different agro-ecological conditions

Intensity	Natural conditions				Total
	1	2	3	4	
High	11	6	9	2	28
Moderate	4	5	7	1	17
Low	9	5	12	7	33
Total	24	16	28	10	78

Source: FADN CZ VÚZE Prague, Database of the thematic line 04 a 05 the MENDELU research object, ČSÚ, authors calculation

III: Development of average level of intensity in the years 2001–2006 in different agro-ecological conditions (in CZK)

Natural condition	2001	2002	2003	2004	2005	2006	2001–6
1	33 666	33 458	29 323	32 675	29 996	28 967	28 967
2	27 670	27 251	26 603	27 318	27 796	28 305	28 305
3	24 134	26 631	24 295	26 566	24 911	24 761	24 761
4	15 057	17 305	17 466	17 861	18 149	17 463	17 463
Total	26 628	27 663	25 440	27 621	26 874	26 524	26 792

Source: FADN CZ VÚZE Prague, Database of the thematic line 04 a 05 the MENDELU research object, ČSÚ, authors calculation

Notes: You can find the determination of the different natural conditions in the chapter Materials and methods.

The comparison of data given in Tab. I and III. shows that different agro-ecological conditions have certain impact on the differentiation of the development of intensity of agricultural production but these are neither determinative nor decisive factors in this process.

CONCLUSIONS

During the period of the research, the agriculture of both the Czech Republic and the set of researched businesses went slightly down but there appeared inter-enterprise differentiation in the development of intensity of use of farm land. The research has identified quite a large group of enterprises aiming at a more intensive type of farming and also

a number of enterprises aiming at a more extensive type of farming.

The inter-enterprise differentiation of the level of intensity of farming is obvious under all agro-ecological conditions. In the regions with more favourable natural conditions slightly bigger number of enterprises with higher intensity is to be found. Majority of enterprises showing tendency toward more extensive farming can be seen in worse natural conditions (LFA). The impact of different agro-ecological conditions on the development of intensity of farming is obvious but not dominant. The decisive factors for the different developments probably lie mainly in the consequences of the choice of orientation of the enterprises, and the overall standard of the farm, and its management.

SUMMARY

The thesis summarizes the knowledge from the research of the agricultural produce intensity in the companies, which are running their business in different agro-ecological conditions of the Czech Republic. The analysis was made in the chosen group of companies from the area NUTS II Southeast during the period 2001–2006 and shows that there is significant and deepening intercompany differentiation in the intensity progress. Average Earnings from Produce per hectare was 26 792 Czech crowns per hectare and the decrease of the agriculture intensity was 179 Czech crowns per hectare. From the variability factors of the agricultural land use intensity level, the influence of different natural conditions is decreasing.

REFERENCES

- BEČVÁŘOVÁ, V., GREGA, L., VINOHRADSKÝ, K., 1998: *Konkurenceschopnost českého zemědělství při vstupu do Evropské unie – předpoklady a možnosti*. Závěrečná studie. Brno 1998, s. 63.
- BEČVÁŘOVÁ, V., VINOHRADSKÝ, K., 2005: Intenzivní a extenzivní soustavy zemědělského hospodaření a příjmový potenciál zemědělských podniků. *Aktuální problémy a perspektivy agrárního sektoru po vstupu do Evropské unie*. Nitra: FEM SPU Nitra, s. 27–32. ISBN 80-8069-637-3.
- BEČVÁŘOVÁ, V., VINOHRADSKÝ, K. 2005: *Koncepce zemědělských dotací a kritérium rozdílných přírodních podmínek zemědělství*. *Aktuální ekonomická problematika zemědělských podniků III: 1. vyd.* Praha: Výzkumný ústav zemědělské ekonomiky, s. 137–142. ISBN 80-86671-30-5.
- GREGA, L. a kol., 2004: *Mimoprodukční přínos trvale udržitelného multifunkčního zemědělství v podmínkách ČR, část I Analýza finančně ekonomické situace zemědělských podniků a jejich důchodových zdrojů*. Průběžná výzkumná zpráva za rok 2003, MZLU Brno.
- HANIBAL, J. et al., 2004: *Uplatnění „Zemědělské účetní datové sítě“ (EADN) v České republice*. Výzkumná studie č. 78, Praha – Výzkumný ústav zemědělské ekonomiky, ISBN 80-86671-23-2.

Address

Ing. Eliška Svobodová, prof. Ing. Karel Vinohradský, CSc., Ústav regionální a podnikové ekonomiky, Mendelova univerzita v Brně, Zemědělská 1, 613 00 Brno, Česká republika

